



Munich Personal RePEc Archive

## **How “Point Blindness” Dilutes the Value of Stock Market Reports**

Arthur Lupia and Yanna Krupnikov and Adam Seth Levine  
and Cassandra Grafstrom and William MacMillan and Erin  
McGovern

University of Michigan

15 July 2008

Online at <https://mpra.ub.uni-muenchen.de/9604/>

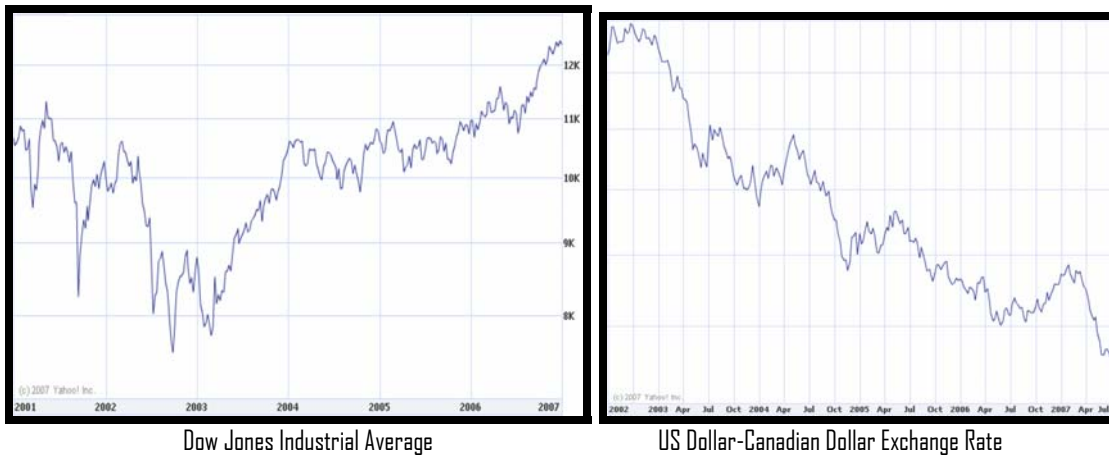
MPRA Paper No. 9604, posted 17 July 2008 01:05 UTC

## How “Point Blindness” Dilutes the Value of Stock Market Reports

Arthur Lupia, Yanna Krupnikov, Adam Seth Levine,  
Cassandra Grafstrom, William D. MacMillan, and Erin McGovern

University of Michigan

July 15, 2008



Arthur Lupia is the Hal R. Varian Collegiate Professor of Political Science and Principal Investigator of the American National Election Studies at the University of Michigan. Cassandra Grafstrom, Yanna Krupnikov, Adam Seth Levine, William D. MacMillan, and Erin McGovern are graduate students in the Department of Political Science at the University of Michigan. Lupia acknowledges the financial support of the John Simon Guggenheim Foundation and the Center for Political Studies at the University of Michigan.

We thank Katherine Drake, Ramy S. Farid, Erika Franklin Fowler, Robert J. Franzese, Jacob Hacker, James D. Morrow, Spencer Piston, Paul Quirk, Tyler Shumway, and Alexander Von Hagen-Jamar for helpful comments on the initial version of this draft. We thank Kelly Ogden-Schuette for research assistance.

## **How “Point Blindness” Dilutes the Value of Stock Market Reports**

### *Abstract*

The stock index “point” is a focal component of financial news reports. While much attention is paid to changes in stock index point totals, few people realize that the value of a stock index “point” varies (and has recently declined). We call this perceptual phenomenon “point blindness” and explain its threat to investors. Simple changes in media presentations of stock index information can counter point blindness. These changes are easy to implement and can help audiences make better financial decisions. An experiment on over 2000 participants shows such changes significantly altering their perceptions of the stock market.

Millions of Americans pay attention to US stock market news. They get this news from many sources. Print outlets, 24-hour news networks, and thousands of websites provide scores of financial reports. Many of these reports focus on the rises and falls of major stock indices. As Shiller (2001:60) puts it, “Nothing beats the stock market for sheer frequency of interesting news items.”

One reason for increased attention to the stock market is an important shift in responsibility for the post-work well being of American workers. Part of this shift is from employers to workers. Participation in defined benefit plans (e.g., pensions) has dropped significantly over the past two decades while participation in defined contribution plans (e.g., IRAs, 401(k)s and 403(b)s) has skyrocketed (Poterba et al 2006). A parallel shift from government to workers is also occurring due to growing doubts about the extent to which Americans can count on Social Security for retirement income. As the 2007 Annual Report of the Social Security Administration states:

“The financial condition of the Social Security and Medicare programs remains problematic; we believe their currently projected long run growth rates are not sustainable under current financing arrangements. Social Security's current annual surpluses of tax income over expenditures will soon begin to decline and then turn into rapidly growing deficits as the baby boom generation retires.... The longer we wait to address these challenges, the more limited will be the options available, the greater will be the required adjustments, and the more severe the potential detrimental economic impact on our nation.”<sup>1</sup>

Where recent generations looked to pensions or government for post-work guarantees of income, younger and middle-age workers have a different future ahead. Their future financial security is more likely to depend on their own and others' investment decisions. As a result, what people believe about the stock market matters not just to their own financial futures but also to governments (and others whose assistance will be sought) if large numbers of investors make bad choices simultaneously. For these

and other reasons, the inferences that Americans draw from stock market news have important implications.

In what follows, we use several analytic methods to examine how a key piece of information about stock market performance is communicated through news reports and understood by citizens. The piece of information is the value of a stock index “point.” Many “business” or “finance” news segments begin with reports about the daily movements of major stock indices. A common highlight of such reports is that a stock index is up or down a certain number of “points” (e.g., “the Dow was up 30 points today and the S&P was up 7”). On days when these changes are large, they grab headlines.

Do media reports of this kind fuel a consequential mass blindness? We argue that they do. While many reports focus people’s attention on the changing number of stock index “points,” few, if any, offer information indicating the frequently changing value of an index “point.” Hence, people perceive a Dow, S&P, or NASDAQ point in the way that they perceive a “centimeter” or a “day” -- as metrics of constant value. They are not.

We call the perceptual phenomenon *point blindness* (i.e., a blindness to changes in the value of a stock index point). Point blindness can reduce the informative value of stock market reports and can lead people to systematically misestimate domestic stock returns relative to other possible investments. It also increases the risk of new demands on future governments if many prospective retirees make such errors simultaneously.

In what follows, we explain how the value of a Dow Jones Industrial Average (DJIA) point has changed in recent years, examine the extent to which this change has been reported, derive a simple palliative to counter point blindness, and evaluate the palliative using an experiment. We do this in three steps.

First, we use a thought experiment entitled “Loonies Under Your Bed” to show how point blindness, in combination with a widely-unappreciated recent drop in the value of “DJIA points,” casts the oft-reported gains of the “extended bull market of 2002-2007” in a sobering light.

Second, we examine how a leading media outlet reports stock market information. Our content analysis of *New York Times* stories during the fall of 2006, when the DJIA was reported as having broken many records, confirms that its reports did not alert readers to a notable decline in the value of index points. In other words, important information about the 2002-2007 dilution in the value of a DJIA point went unreported. Hence, existing reports fuel point blindness amongst those persons who rely on publications such as the *Times* for financial news.

Third, we argue that simple alterations to current means of presenting stock market information can help people adapt to point blindness. These alterations entail a commitment to making objectively relevant fluctuations in the value of a DJIA point easier for audiences to perceive. Such alterations can convey important information to millions of investors. To examine whether such effects occur, we report on the results of an experiment run on a nationally representative sample of over 2000 Americans in 2008. It demonstrates that simple presentational changes of the kind just described have large effects on how many in the public perceive the stock market. These results support our main conclusion, which is that simple changes in media coverage of the stock market can counter point blindness.

In sum, the shift in retirement income responsibility from employers and government to workers makes recognition of point blindness important. Combating point

blindness by paying greater attention to how stock market information is conveyed, and understood, is a topic in which individuals and governments have a long-term interest.

***“Loonies under Your Bed”***

Here, we describe a thought experiment that reveals the potential significance of point blindness. The experiment can begin on any day in the years 2001 through 2007. For the sake of example, we focus on January 2, 2001, the first day in our database. (Later, we will show that what we find to be true about this day is true for many others.)

On the start date of the experiment, a subject is given the number of US dollars (USD) that matches the closing point total of the DJIA. On January 2, 2001, this amount is \$10,646.15. With this money, she can do one of two things.

*Option 1.* Use her USD to buy “one share of that day’s DJIA.” On January 2, 2001, such a purchase will result in her owning approximately 6.5 shares of each of the DJIA’s 30 components. The reason that “one share of the January 2, 2001 DJIA” gives her so many shares of stock is that the reported DJIA point total is the sum of the components’ listed closing prices adjusted by a divisor. The DJIA divisor is adjusted after any significant change in a DJIA component or in the index itself. Its purpose is to reduce the impact of such events on daily movements of the DJIA’s point total. On January 2, 2001, the divisor was 0.15369402, which meant that the summed cost of one share of each DJIA component was 1636.25 USD. So for 10646.15 USD, the subject can purchase 6.506432 shares of each component. To simplify the example, we assume that she pays no commissions or other transaction costs when acquiring or selling the stocks, she collects any dividends that accrue to the stocks that she holds, and she benefits from splits or similar passive benefits of stock ownership.

*Option 2.* Go to a bank and exchange 10,646.15 USD for the number of Canadian dollars (CAD) that have the same worth on that day. Again, to keep the example simple, we will assume that she does not pay any fees for the exchange. On January 2, 2001, the CAD-USD exchange rate was 1.4914, so she can obtain 15,877.67 CAD. (Later, we will show that what we find to be true about this currency is true for many others.)

There is one additional rule. Whichever option she chooses, she must put the assets under her bed and keep them there until a pre-specified “cash out” date. Until that date, she must be a completely passive investor. For the purpose of the example, we focus on a “cash out” date of December 31, 2007 – the final trading date of that year. Later, we examine the consequences for all possible “cash out” dates ranging from one year after the start date to December 31, 2007 – the last day in our database.

So, if she buys the stocks, she cannot change her investments if something better comes along and she cannot sell any of her holdings in order to buy a good or service. If a company she owns offers a choice about how to handle a dividend or proceeds from a spin-off, she experiences the consequence that comes from being passive (i.e., not responding). This implies that dividends can be accumulated but not invested. In short, she must put the stock certificates and any passive gains under her bed where, for the purpose of the example, we will assume they are safe.

If she takes the Canadian dollars, parallel rules apply. She cannot put the money in a bank and collect interest. She cannot reinvest it or spend it. She must simply stuff the currency under her mattress, where we assume it will be safe.

It is worth noting that this assumption introduces a bias that favors Option 1. Option 1 allows the subject to own shares of firms that hold assets in interest bearing



accounts. Gains from the accounts can raise the firms' share prices or be transferred to investors through dividends. So, choosing Option 1 can provide interest income to the subject in a way that Option 2 cannot. We accept the asymmetry because it follows from our core assumption of investor passivity.

*What should the subject do?* Should she purchase multiple shares of thirty widely-owned icons of American industry during a period that was widely hailed as an "extended bull market" or obtain a currency that is rarely held by Americans or discussed in stock market news?

Before answering this question, we introduce a simplification. Instead of talking about US dollars and Canadian dollars, which can get confusing to people who are accustomed to thinking about "dollars" without respect to nation of origin, we will refer to the Canadian currency by its distinct nickname. In Canada, the dollar is nicknamed "the loonie." This nickname is so given because the dollar coin has loons (aquatic birds) engraved on its front.

Now, consider the subject's fate if she chooses Option 1. We begin by saying a few words about how to think about the value of a stock index. On any given day, there is a strict linear relationship between USD and DJIA points.<sup>2</sup> When a report says that the DJIA gained 35 points, it means that it costs 35 USD more to buy "one share of that day's DJIA" at the end of the trading day than it did at the beginning.

On December 31, 2007, the DJIA closed at 13264.82 USD. This amount is 2,618.67 points greater than the January 2, 2001 close. However, if the subject bought "one share of the DJIA" on January 2, 2001, the value of her holdings is different than 13264.82 USD. The reason is that DJIA components do not remain constant over time.

Some stocks that were part of the DJIA in 2001 were not part of it in 2007. Decisions about DJIA components are made by the editors of *The Wall Street Journal*, which is owned by Dow Jones and Company. From time to time the editors replace companies that go out of existence or are not performing well with other large firms that have strong growth prospects. In the time period of our study, one set of replacements was made. On April 8, 2004, American International Group, Pfizer, and Verizon replaced American Telephone and Telegraph, Eastman Kodak, and International Paper on the DJIA.<sup>3</sup>

So on December 31, 2007, the value of one “share of the DJIA” bought on the first trading day of 2001 was 13432.06 USD. But, the subject’s investment is worth more than this. When we add passive gains (dividends received, additional shares gained from splits, and revenues coming from spinoffs), the USD value of her assets is 14859.70.<sup>4</sup>

So if she sells the stocks on December 31, 2007, she realizes a gain of 4213.55 USD. But she has to pay taxes on this gain. Since she held the assets for more than a year, the tax rate on her capital gains and dividends is 15% (assuming that the subject’s total income is in the middle to upper ranges). After paying taxes, she has 14227.66 USD – *a gain of 3581.52 USD.*

Now, consider the subject’s fate if she chooses Option 2, loonies under the bed. While she may rue the fact that she was not allowed to collect interest on the CAD, *she is better off than if she chose the stocks.* At December 31, 2007’s exchange rate of 0.9964, she can exchange her 15877.67 CAD for 15935.04 – *for a gain of 5288.89 USD.* Since the loonies were simply held under a bed, this gain is not taxable.

Loonies under a bed provided a better return than buying into the most widely-reported stock market index soon after the collapse of the dot-com stock bubble and

selling near the tail end of a widely-reported “extended bull market” of 2002-2007.<sup>5</sup> Does the same result emerge on other “cash out” dates?

Figure 1 shows how the subject would have fared, using the calculation detailed above, after buying her assets on January 2, 2001 and selling them on any day from January 2, 2002 to December 31, 2007. When the loonie line is above the DJIA line, it means that putting loonies-under-the-bed on the noted “cash out” date provides a greater return than holding a share of the DJIA.

[Figure 1 about here.]

Figure 1 reveals that the loonie line is consistently north of the post-tax DJIA line. **That is, for the subject making a choice on January 2, 2001, loonies under the bed provided a greater return on investment than did “one share of the DJIA” on every possible “cash out” date in 2002 through 2007.** Even without taxes, the same is true for almost every “cash out” date in this range.

Figure 2 extends this analysis further. There are 1,134,160 pairs of “cash in” and “cash out” dates that occur within the years 2001-2007 and are at least one year apart. The figure depicts results of our thought experiment for every conceivable pair.

Using one year as the shortest holding period simplifies our presentation of post-tax consequences and again biases the experiment in favor of Option 1 (as returns from assets held for periods of less than a year can be taxed at substantially higher rates). We also assumed that the proceeds from the sale of “one share of the DJIA” would be taxed under the investment-friendly tax code revisions of May 2003 even if the “cash out” date in our analysis occurred before that date. Had we allowed shorter holding periods or

calculated returns using the earlier tax rates, the post-tax returns for Option 1 would be no better and, in some cases, substantially worse.

Returning to Figure 2, red pixels depict holding periods in which loonies outperform the DJIA. Green pixels depict the opposite. **In over 90% of all holding periods (1,031,839/1,134,160) “loonies under a bed” outperform “one share of the DJIA.”** If, by some means, the subject could avoid the taxman when her “cash out” date arrived, she would still be better off with “loonies under her bed” in roughly half of the possible holding periods (558,236/1,134,160). In reality, however, she must pay taxes. Hence, measured multiple ways, and making several assumptions that favor Option 1, we find that placing loonies under a bed provided greater returns to investors than buying a share of the nation’s most widely-reported stock index during a period that was widely hailed as a very significant bull market.

[Figure 2 about here.]

Similar results can be achieved with other currencies. Consider, for example, the Euro. Conducting an analysis that follows the procedures just described, we find that in nearly 76 % of all holding periods of one year or greater (860,594/1,134,160), “Euros under a bed” provided a greater post-tax return than “one share of the DJIA.”

Taking a broader view, there are twenty-six currencies that are regularly featured in the “economic and financial indicators” section of *The Economist* and were not pegged to the dollar at any time during 2001-2007. Figure 3 shows at least three things about these currencies. First, the USD fell against 23 of the 26 currencies during this period. Second, amongst the 23 currencies against which it declined, the average decline was over 36%. Third, the seven-year return on “one share of the DJIA” is comparatively low

on this list. Therefore, stuffing any one of roughly half of these leading currencies under a mattress at the beginning of 2001 and leaving them there until the end of 2007 provided a greater return than buying a share of the DJIA.

[Figure 3 about here.]

A key intuition of this thought experiment is that when the US dollar falls against a wide range of other potential assets, it drags the relative value of a DJIA point down with it. Figure 4 makes the point directly. The first part of the figure shows the USD falling against the Euro, loonie, and the price of an ounce of gold. The second part shows that the declining USD dragged the relative value of the DJIA down with it. In other words, in these years, the USD (measured in many ways) fell faster than the DJIA rose.

[Figure 4 about here.]

During the extended bull market of 2002-2007, many news reports celebrated a sequence of spectacular increases and record highs in the DJIA. At the same time, the value of the USD relative to other focal financial metrics declined sharply. News reports that failed to draw attention to changing DJIA point values fueled “point blindness” amongst their readers. As a result, the informative value of DJIA increases or record highs to investors became diluted.

To some, our demonstration of the USD’s decline signals inflation. This inference misses the point of our argument. Individual investors can do nothing about price levels. They can make choices about how to allocate their assets. Reports that the DJIA is increasing or breaking records, can lead point-blind investors to overvalue their DJIA stocks relative to other possible investments (such as those whose values are not

anchored to USD).<sup>6</sup> Point blindness, if unchecked, can skew investor perceptions about whether they are allocating their assets effectively and reduce long-term returns.

### ***How the News Fuels Point Blindness: A Content Analysis***

If people would benefit from thinking about stock market reports in ways that reflect the changing value of DJIA points, then most news reports are unhelpful. During the extended bull market of 2002-2007, news outlets produced many stories about the rise of the DJIA. They also offered many stories on the fall of the USD. They offered few, if any, stories that related the two topics.

July 12, 2007 was the kind of day on which we might expect to see such a connection. On this day the USD hit a record low against the Euro and approached a multi-decade low against the loonie. On the same day, the DJIA achieved a record high. On July 14, the *New York Times* published a story that discussed the day's events. It read,

“Wall Street ended a record-setting week yesterday by surging again, sending the Standard & Poor’s 500-stock index past a trading high set in March 2000 and thrusting the Dow Jones industrial average past 13,900 for the first time. Both the S.& P. and the Dow logged record closes for the second straight day. The blue-chip index gained 295.57 points for the week...

The dollar was... still trading at a record low versus the euro and 26-year low against the British pound...”<sup>7</sup>

That this article does not link the DJIA’s record high to the USD’s lows is not an anomaly. As evidence, we report results of a content analysis of *New York Times* articles that appeared in the final quarter of 2006. We selected this time period because the DJIA achieved 21 record-high closes within it.<sup>8</sup> We selected *The New York Times* because of its wide circulation and our belief that its stock market reporting is relatively sophisticated.

The sample of articles we analyzed met the following criteria: they were published in the two days following a DJIA high (e.g., for the October 5, 2006 high we

included articles that were published on October 6 and October 7) and included the word “Dow” in their headline, lead paragraph or key terms. Fifty articles published over a total of 32 days met these criteria.<sup>9</sup> Table 1 gives an overview of our findings.

[Table 1 about here.]

Our analysis first considered graphics. Since graphics are often more striking than text, we analyzed the content of the graphics in all of the articles. Of the 50 articles that fit our criteria, 46 featured accompanying graphics, of which 28 focused on the changes in the number of DJIA points (the other graphics included different content such as photographs of traders). Of the 28 “point total” graphics, none provided visual stimuli that would induce any manner of thinking about changes in the value of a DJIA point.

We next analyzed text. Ten of the DJIA articles mentioned the value of the USD in the context of exchange rates. Only one article connected stock index increases to the USD’s decline -- an October 7 column by Floyd Norris. The article compares recent returns from many national stock indices. The values of foreign indices are stated in USD terms. Many nations’ main stock indices are shown to outperform the DJIA. Norris (2006) points out that his finding is based, in part, on the USD’s decline.

“Most European markets are shown as being higher than they were in early 2000, but most or all of those increases reflect the fact that the moves are based on dollar performance. The CAC 40 in France, for example, is shown as being up 13 percent, but it is down almost 10 percent in Euros. The gain came solely from the dollar’s weakness.”

This article, which explains that nominal gains can be deceptive if one does not understand the underlying metric, is the *sole exception* to a rule. In all other cases, *Times* readers are not provided with graphics or text that would cause them to ask whether the USD’s fall undermined the implications of the DJIA record highs.

The *Times*' presentations, and that of other leading media outlets, regularly reinforce a *point blindness* that limits the informative value of their coverage to their audiences. In making this claim, we should note that point blindness is similar to a perceptual phenomenon that economists (e.g., Fisher 1928, Shafir et al 1997, Tyran 2007) have observed for decades – the tendency to confound real and nominal asset values (a differentiating attribute of point blindness is that its relevance to investors does not depend on price levels *per se*). Given the length of time for which such perceptions have been discussed, one might expect the nominal basis of a DJIA point to be a regular feature of DJIA reports. Our content analysis suggests that *it is not*. But it can be. In what follows, we build from psychological insights about how people form perceptions to argue that simple changes in media presentations of stock market information can help investors adapt to point blindness.

### ***Countering Point Blindness by Changing the News***

If point blindness is fueled by media coverage of the stock market, what can be done about it? We begin with the premise that attention is scarce (Simon 1955). With this premise in mind, to what kinds of stock-related information are people most likely to attend? Hirshleifer and Teoh (2003) argue that people pay attention to information that is most salient. Gabaix et al (2006) claim that people pay attention to informational details that are relevant to the decision they are making and that vary across the alternatives from which they can choose. These studies pose relevance and salience as objective attributes and explain why people should pay attention to them. But they do not examine conditions under which people might fail to do so.



Tversky (1977) and Einhorn and Hogarth (1981), among others, have examined such questions in greater depth. They use a *diagnosticity* criterion to explain attention allocation. An object is diagnostic when it allows people to distinguish between alternatives (Skov and Sherman 1986). While similar to the notions of “salience” and “relevance” highlighted above, there is an important difference between these concepts and diagnosticity. Where the studies cited in the previous paragraph treat salience and relevance as objective attributes, the studies cited in this paragraph treat the diagnosticity of an object as the outcome of a (more subjective) cognitive process.

An object’s diagnosticity is the product of the *context in which the information is presented* (Einhorn and Hogarth 1981, Medin, Goldstone and Gentner 1993, Lurie and Mason 2007) and *an individual’s prior knowledge of the content* (Kardes, Kim and Lim 1994; Rao and Monroe 1988). ‘Context’ refers to the mode of presentation, the order of presentation, and other information the individual is receiving at the same time. “Knowledge” refers an individual’s ability to relate the object to a decision. When context is easier to change than an individual’s prior knowledge (which we shall assume is true in the case of interpreting financial information – most people choose not to take classes on the subject), the studies just cited show that contextual changes can alter the diagnosticity of an object even when the object’s true relevance to the decision s unchanged. So, if people are already attending to a piece of information (e.g., reports about the total number of DJIA points), changing the context can make previously unseen objects (e.g., the value of a DJIA point) salient in evaluation (i.e., more diagnostic).

Typical news reports present DJIA information in ways that make the value of a point non-diagnostic. Most reports direct great attention to changes in the number of DJIA points. They direct no attention to changes in the value of a DJIA point.

We contend that alternate presentational strategies can increase the diagnosticity of DJIA point variations. We conjecture that simply presenting stock index information in terms of a viable alternate measure (such as non-USD currencies and gold prices) will cause at least some people (those with sufficient prior knowledge) to think about stock market returns differently than they would if exposed only to conventional presentations.

To test this conjecture, we conducted an experiment on over 2000 Americans. We embedded the experiment in a survey that Knowledge Networks (henceforth, KN) conducted for us from February 13 to 26, 2008. KN uses random digit dialing techniques, callback strategies, and incentives to initiate and sustain contact with a nationally representative Internet panel of American citizens aged eighteen and above. The subjects in our study constitute a randomly selected subset of the KN panel and approximate a random sample of the U.S. adult population. Our survey was assigned to 3,059 KN panelists.<sup>10</sup> Of those, 2,039 (66.6%) completed the study.<sup>11</sup>

We randomly assigned the 2039 subjects into one of eight experimental groups. One group, henceforth known as the “no report” group, received no information about stock indices. All other subjects received information about the performance of the DJIA in the year 2007 (a.k.a., the stimulus). The only factor distinguishing the seven treatment groups was the manner in which we conveyed this information. Figure 5 provides a visual representation of the experimental design.

[Figure 5 about here.]

One treatment group received this news in a conventional way – the DJIA’s performance was simply stated in USD terms. The phrase

**“In the year 2007, the value of the Dow Jones Industrial Average *increased by 6%* when measured in U.S. Dollars.”**

appeared in the center of their screen for five seconds -- at which point the subject was given the option to advance to the next screen.

Three other treatment groups saw one of the following phrases under conditions identical to those just described:

**“In the year 2007, the value of the Dow Jones Industrial Average *decreased by 4%* when measured in Euros.”**

**“In the year 2007, the value of the Dow Jones Industrial Average *decreased by 9%* when measured in Canadian Dollars.”**

**“In the year 2007, the value of the Dow Jones Industrial Average *decreased by 19%* when measured relative to the price of an ounce of Gold.”**

We refer to these three treatment groups collectively as “single-currency treatments.”

The three remaining treatment groups received *two* pieces of information in the center of the screen. The first piece of information for all three groups was the USD-denominated DJIA claim described above. The second piece of information was one of the three non-USD denominated DJIA claims (EURO, CAD, or Gold) listed above. We refer to these three treatment groups collectively as “double-currency treatments.”<sup>12</sup> The purpose of these treatments was to evaluate whether the new presentations would be effective if presented at the same time as the conventional (USD) presentation. With this design in mind, it is important to note that no subjects were deceived in this experiment. While we manipulated the presentation of information across treatment groups, every claim above about the DJIA is accurate (with percentages rounded).

After providing the stimulus, we asked all subjects who were exposed to a stimulus (everyone except “no report” group subjects): “Given what you have just read, would you say that in the year 2007, the stock market performed “much better than you believed prior to starting this survey”, “somewhat better than you believed prior to starting this survey”, “the same as you believed prior to starting this survey”, “somewhat worse than you believed prior to starting this survey”, [or] “much worse than you believed prior to starting this survey.” In what follows, we simplify the presentation by using the “worse” responses as summary statistics for experimental effects generally. Our results would be parallel had we focused instead on “better” responses.

In sum, this experimental design varies the context to make a stock index point’s relationship to USD more salient, and perhaps, diagnostic. Since diagnosticity depends on context and a viewer’s prior knowledge of content, our expectation is as follows: *Subjects with sufficient prior information about the stimuli will, after viewing a non-conventional presentation, perceive the DJIA’s 2007 performance more negatively than subjects who are randomly assigned to view a conventional (USD based) presentation.*

Before we show the results, it is worth noting that two attributes of the design work against seeing our hypothesized effect. First, subjects receive *only one exposure* to a stimulus that may be as brief as five seconds long. No announcer or accompanying text puts the sentences into a broader context. In this experiment, the subject is left to do that on their own, despite the fact that verbal or textual reinforcements often accompany the presentation of DJIA information. Second, in some treatments we explicitly state that the DJIA “*increased by 6% when measured in U.S. Dollars.*” Being explicit about the DJIA-USD link is necessary for us to make truthful, parallel, and comprehensible statements to

subjects about DJIA performance measured in Euros, CAD, or gold. Hence, for subjects in the experimental groups that include the USD statement, *the stimulus draws explicit attention to the DJIA point-USD link* (to which we assume most subjects were heretofore blind). If subjects recognize this cue, it will serve to reduce the effect of the experimental variations even more. Hence, given these design attributes, ours is *a conservative test* of the proposition that these alternate presentations of stock index information can counter point blindness.

### ***Results from our Experiment***

Figure 6 provides depicts subjects' responses within the single currency treatments as compared with the USD group. In these and other results that follow, we use education as a proxy for prior knowledge about the stock market (which, as stated above, will affect the extent to which the stimulus can make the value of a stock index point diagnostic). For presentational simplicity, we display results first for all subjects and then by whether or not subjects completed high school. Subjects who did not complete high school are categorized as "low" in education; all others are categorized as "high" in education. We choose this presentational breakdown because this "low" education group reacts to the stimuli quite differently than all other subjects.

[Figure 6 about here.]

Figure 6 focuses on the percentage of subjects for whom exposure to the stimulus made them feel "worse" about the DJIA in 2007. For the population of subjects considered as a whole, those who received this information in the conventional way (in USD terms) twenty percent reported that this report made them feel worse about the stock market. People who viewed DJIA information in non-USD terms saw matters differently.

Their judgments about the Dow were harsh. For the sample as a whole, when DJIA information for 2007 was presented in non-USD terms, over 40% of subjects in the single-currency treatments thought worse of the stock market's performance. The difference between the USD and non-USD groups was particularly severe for better educated subjects as the bottom two panels of the figure demonstrate. In other words, for subjects with a high school education or greater a single brief exposure to a non-USD delineated DJIA performance report doubled the percentage of subjects who responded that the stock market performed worse than they thought. For each of the three single-currency treatment groups, the difference between them and the USD group is statistically significant at the .001 level.<sup>13</sup> Conveying DJIA information in a different manner led many people to view the index in more sobering light.<sup>14</sup>

The results were different for less educated subjects. There is no consistent response pattern across experimental treatments. Since the experimental variation only had significant effects on the high education group, we can reject an alternate explanation for these results: that all subjects were merely reacting to whether the number in the stimulus was positive or negative. The high education group used the stimuli in a systematic and consistent manner that is consistent with increased diagnosticity of varying index point values, while the low education group did not.

To be sure, our results are driven in part by the fact that in 2007, the DJIA “went up” when measured in USD and “went down” when measured in other currencies. But such differences in numerical content can happen *only if* more than one evaluative metric is used. As such, the alternate reports can change the inference that people draw from stock index claims. What this kind of report can do is convert audiences who simply hear

“up” as “(absolute and unconditional) up” into audiences who now think “up *with respect to what?*” Once they have such thoughts, the potential wisdom of widely recommended asset allocation strategies (such as international diversification strategies that reduce “home bias” and provide currency hedges), may become more salient.

Next, we examine the effect of the double-currency treatments. Figure 7 depicts subjects’ reactions from these groups relative to the USD group. Again, we display results by education levels. These results mirror the results from the single currency treatments: simple alterations to presentations of stock index information make variations in the relative value of DJIA points increasingly diagnostic (for subjects with a high school education or better). For the subject population as a whole, the direction of the effects in these treatments is the same as described above, though the magnitude of the effect is smaller. Thus, many subjects who completed high school based their stock market, at least in part, on the non-USD content (even though the USD presentation was readily available to them).

[Figure 7 about here.]

To further document whether alternate presentation strategies affect public opinion about the stock market, we next asked subjects, “How would you rate the overall condition of the stock market in the year 2007?” They could respond “Very Good”, “Somewhat Good”, “Neither Good nor Bad”, “Somewhat Bad”, [or] “Very Bad.” Figure 8 depicts these results for the single-currency (8a) and double-currency treatment groups (8b), respectively. It highlights the percentage of subjects in each group who responded “somewhat bad” or “very bad” to the question.<sup>15</sup>

[Figures 8a and 8b about here.]

The results parallel those seen earlier. Subjects in the single-currency treatment groups graded the stock market's health as significantly worse than those who were told about DJIA performance in USD terms -- and as Figure 8a reveals, these differences are particularly stark for those individuals with high levels of education. Results from the double-currency treatments are in the same direction as the single-currency results. Again, as Figure 8b shows, the effect is greater for more educated subjects. Considered altogether, the results from Figures 6-8 suggest that even a single brief exposure to DJIA information presented in non-USD terms can change how people evaluate stock returns.

When media reports fuel "point blindness," they give viewers no motivation to doubt judgments about the stock market that are based on false assumptions about the constant value of a stock index point. But this blindness can cause them to undervalue stocks and stock indices whose values are USD-denominated when the USD is rising against other plausible stores of value and it can lead investors to overvalue stocks and stock indices when the USD falls. Simple changes in the way that stock information is conveyed can help people adjust their expectations in ways that can protect them from suboptimal inferences about relative investment returns that point blindness can cause.

Having established that alternate presentation of stock market information can affect citizens' opinions, the question becomes which alternative presentation to make. In our view, the answer to this question depends on the audience. It is arguable that some people would learn more by having DJIA values reported with respect to a consumer price index. Setting aside the debate about which CPI measure one would use (see, e.g., Hausman (2003)) such a comparison would signal the extent to which currency fluctuation affects purchasing power implications of DJIA points. Others might argue that



since citizens can purchase gold and since gold has played a global and historic role as a store of value, gold should be the alternate basis of comparison. Following from our reading of the diagnosticity literature, we recommend that the alternative be one that the audience perceives as a credible evaluative metric. As a result, different outlets may choose alternative presentations of stock market indices that best suit their audiences.

Since some readers have asked us to go further in our recommendation, we use the joint lessons of the survey experiment and the thought experiment to produce a brief discussion of why prominent outlets might consider reporting a DJIA-Euro index on a regular basis. This idea would be particularly appropriate for news outlets whose audiences could benefit from comparing the returns of US-based investments to rates of return of investment vehicles based elsewhere.

One reason to use the Euro in addition to the USD is that in recent years, the credibility of Euro-as-reserve-currency has increased. In the first quarter of 2001, for example, 72.3% of the world's reserve currency was held in USD according to International Monetary Fund estimates.<sup>16</sup> By the first quarter of 2007, the last quarter for which non-preliminary data are available as of this writing, this amount fell to 65.1%. Taking up the slack was the Euro. In the first quarter of 2001, 17.7% of the world's reserve was Euro-denominated. By the first quarter of 2007, this amount grew to 25.4%. From 2001 to 2007, the 7.2 percentage point fall in the USD share of the world's reserve currency was more than matched by the Euro's 7.7 percentage point increase.

This trend is likely to continue. To see why, note that the requirements of a reserve currency are that it be used by a large economy with deep and open financial markets, low inflation, and confidence in its value. The Euro has increasingly satisfied

these requirements. The Euro-zone economy (the economies of the 13 European Union members that replaced their national currency with the Euro by the end of 2007) is large. In 2007, its economy was approximately 88% the size of the US economy and accounted for over 22% of Gross World Product.<sup>17</sup> Moreover, the Eurozone also has increasingly deep and liquid financial markets (Chinn and Frankel 2006). As for confidence, the Euro-zone economy ran trade surpluses from 2001 to 2007 (see Table 2). So the Euro does not face the same trade-deficit-driven downward pressures on demand for the currency as did the USD in the era on which we focused.<sup>18</sup> Collectively, these facts suggest that the Euro is a focal element of global finance and is viable as an evaluative metric for a growing range of investment-related decisions.

[Table 2 about here.]

A second reason to use a DJIA-Euro index is that Americans need not hold all of their assets in USD-anchored instruments. However, in America, as in many countries, “home biases” lead many people to favor domestic instruments over international diversification (see, e.g., Levy and Sarnat 1970, Lewis 1999). As Lütje and Menkhoff (2007:21) explain, “People invest larger shares in home assets than those warranted based upon capital market theory. Hence, they give away available opportunities in order to increase their risk-adjusted returns.” They find “home bias” amongst individual investors as well as mutual fund managers and that “relative return optimism regarding home investments” is an important determinant of “home bias” (2007:22). We contend that regular exposure to stock index information in more than one currency can help investors more easily envision possible benefits of international diversification. In short, countering

point blindness can weaken a psychological support for home bias and empower investors who are interested in increasing long-term risk-adjusted returns.

### ***Conclusion***

From 2001 to 2007, the DJIA's value soared to new heights – as measured in “points.” At the same time, the USD fell precipitously against many other currencies. This decline diluted the value of stock market reports by changing the meaning of claims such as “the Dow was up by 15 points.” Indeed, in many periods when the DJIA rose, the USD fell faster. A consequence is that in many cases returns on investments from “the bull market” were unknowingly eclipsed by the return from the long-disparaged investment strategy of putting money under a mattress (e.g., “loonies under a bed.”)

Important changes in investor perspectives can come from slight alterations to traditional presentations of stock indices. We show that such alterations can make variations in the DJIA point values diagnostic to many readers. Therefore, we recommend that news outlets – at least occasionally -- offer reports about the DJIA and other indices in terms of other credible evaluative metrics.

As an increasing number of Americans now bear greater risks in planning for their financial futures (Hacker 2006), there is a substantial social benefit to helping them problems that “point blindness” can cause. To that end, we have shown that small changes in the emphasis and content of stock market reports to think differently about an important class of assets. Such attentional shifts, in turn, can put investors in stronger positions to protect and enhance their long-run purchasing power.

## REFERENCES

Cohen, Randolph B., Christopher Polk, and Tuomo Vuolteenaho. 2005. "Money Illusion in the Stock Market: The Modigliani-Cohn Hypothesis." *Quarterly Journal of Economics* 120: 639-668.

*The Economist*. 2004. "The Future of the Dollar: The Passing of the Buck." December 2. [http://www.economist.com/finance/displayStory.cfm?story\\_id=3445928](http://www.economist.com/finance/displayStory.cfm?story_id=3445928)

Einhorn, Hillel J., and Robin M. Hogarth. 1981. "Behavioral Decision Theory: Processes of Judgment and Choice." *Annual Review of Psychology* 32: 53-88.

Fisher, Irving. 1928. *The Money Illusion*. New York: Adelphi.

Gabaix, Xavier, David Laibson, Guillermo Moloche and Stephen Weinberg. 2006. "Costly Information Acquisition: Experimental Analysis of a Boundedly Rational Model." *The American Economic Review* 96: 1043-1068.

Hacker, Jacob S. 2006. *The Great Risk Shift: The Assault on American Jobs, Families, Health Care and Retirement – And How You Can Fight Back*. New York: Oxford University Press.

Hausman, Jerry A. 2003. "Sources of Bias and Solutions to Bias in the Consumer Price Index." *Journal of Economic Perspectives* 17: 23-44.

Hirshleifer, David, and Siew Hong Teoh. 2003. "Limited Attention, Information Disclosure, and Financial Reporting." *Journal of Accounting and Economics* 36: 337-386.

Kardes, Frank, John Kim, and Jeen-Su Lim. 1994 "Moderating Effects of Prior Knowledge on the Perceived Diagnosticity of Beliefs Derived from Implicit versus Explicit Product Claims." *Journal of Business Research* 29(3): 219-224.

Levy, Haim, and Marshall Sarnat. 1970. "International Diversification of Investment Portfolios." *The American Economic Review* 60: 668-675.

Lewis, Karen K. 1999. "Trying to Explain Home Bias in Equities and Consumption." *Journal of Economic Literature* 37: 571-608.

Lurie, Nicholas H., and Charlotte Mason. 2007 "Visual Representation: Implications for Decision Making." *Journal of Marketing* 71: 160-177.

Lütje, Torben, and Lukas Menkhoff. 2007. "What Drives Home Bias? Evidence from Fund Managers' Views." *International Journal of Finance and Economics* 12: 21.35.

- Medin, Douglas L., Robert L. Goldstone, and Dedre Gentner. 1993. "Respects for Similarity." *Psychological Review* 2: 254-278.
- Modigliani, Franco, and Richard Cohn. 1979. "Inflation, Rational Valuation, and the Market." *Financial Analysts Journal* 35: 24-44.
- Norris, Floyd. 2006. "Dow Set a Record in Height, but Weight had a lot to do with That." *New York Times*, October 7, Section C, page 3.
- Poterba, James, Joshua Rauh, Steven Venti, and David Wise. 2006. "Defined Contribution Plans, Defined Benefit Plans, and the Accumulation of Retirement Wealth." *National Bureau of Economic Research Working Paper* 12597.
- Rao, Ashkay and Kent Monroe. 1988. "The Moderating Effect of Prior Knowledge on Cue Utilization in Product Evaluations." *Journal of Consumer Research* 15 (2): 253-264.
- Sausgruber, Rupert, and Jean-Robert Tyran. 2005. "Testing the Mill Hypothesis of Fiscal Illusion." *Public Choice* 122 (1): 39-68.
- Shafir, Eldar, Peter Diamond, and Amos Tversky. 1997. "Money Illusion." *The Quarterly Journal of Economics* 112: 341-374.
- Shiller, Robert J. 2001. "Exuberant Reporting: Media and Misinformation in the Markets." *Harvard International Review* 23: 60-65.
- Simon, Herbert. 1955. "A Behavioral Model of Rational Choice." *Quarterly Journal of Economics* 69: 99-118.
- Skov, Richard B., and Steven J. Sherman. 1986. "Information-gathering Processes: Diagnosticity, Hypothesis-confirmatory Strategies, and Perceived Hypothesis Confirmation." *Journal of Experimental Social Psychology* 22: 93-121.
- Social Security Administration. 2007. "Status of the Social Security and Medicare Programs: A Summary of the 2007 Annual Reports. A Message to the Public." <http://www.ssa.gov/OACT/TRSUM/trsummary.html>
- Tyran, Jean-Robert. 2007. "Money Illusion and the Market." *Science* 317: 1042-1043.
- Tversky, Amos. 1977. "Features of Similarity." *Psychological Review* 84: 327-352.

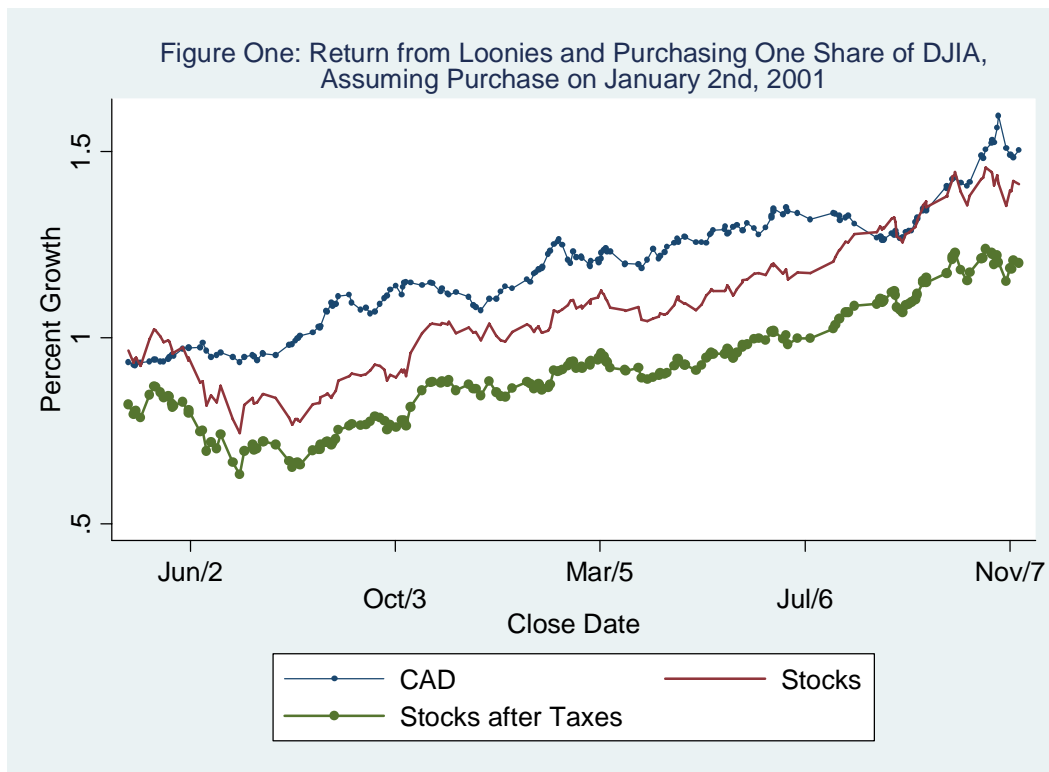
**Table 1. Outcome of Content Analysis**

	Yes	No	Total Number of applicable articles:
<b>GRAPHICS</b>			
Does the article have a graphic?	<b>47</b>	<b>3</b>	<b>50</b>
If so, does the graphic have DJIA content?	<b>28</b>	<b>19</b>	<b>47</b>
If so, does the graphic show fluctuations in the DJIA as a function of exchange rates?	<b>0</b>	<b>28</b>	<b>28</b>
<b>FOCAL CONTENT</b>			
Does the article mention the exchange rate?	<b>10</b>	<b>40</b>	<b>50</b>
If so, does it link a USD exchange rate to the DJIA?	<b>1</b>	<b>9</b>	<b>10</b>
<b>Number of all articles linking a USD exchange rate to the DJIA.</b>	<b>1</b>	<b>49</b>	<b>50</b>

**Table 2: Balance of Trade as Percentage of GDP in billions of home currency.**

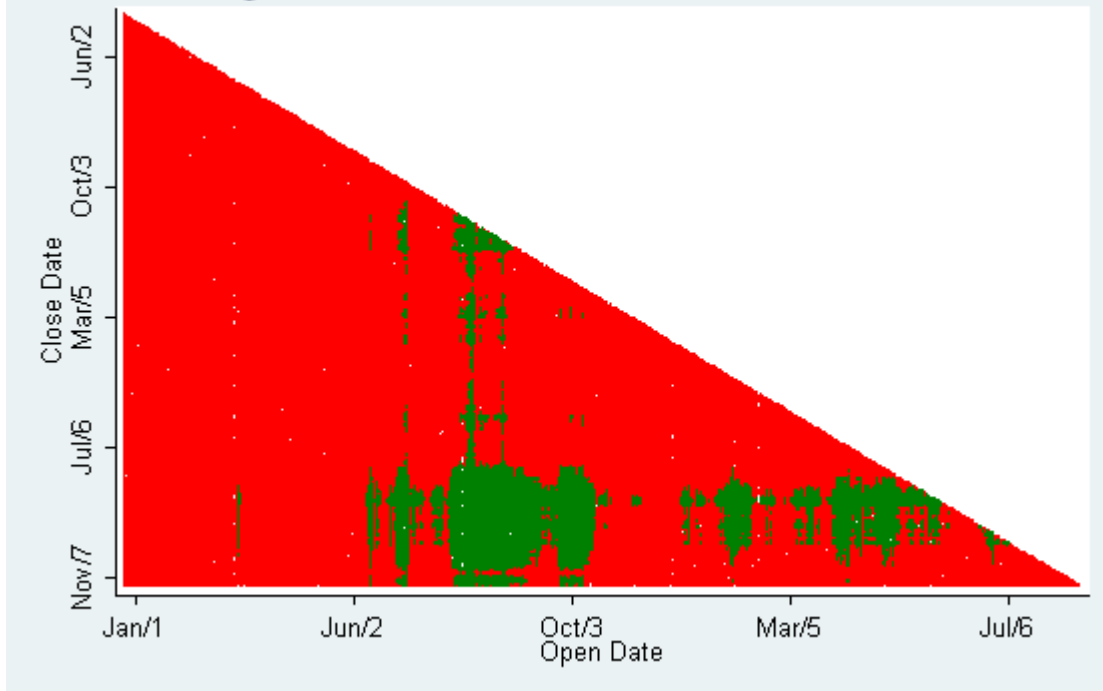
	2001	2002	2003	2004	2005	2006	2007
<b>USA</b>	-450 (-4.4%)	-507 (-4.8%)	-578 (-5.3%)	-707 (-6.1%)	-825 (-6.6%)	-881 (-6.7%)	-854 (-6.2%)
<b>Canada</b>	+33 (4.6%)	+25 (3.4%)	+28 (3.2%)	+25 (2.5%)	+28 (2.5%)	+32 (2.5%)	+46 (3.2%)
<b>Eurozone</b>	+76 (1.2%)	+140 (2.0%)	+138 (1.6%)	+134 (1.4%)	+77 (0.8%)	+186 (0.2%)	+78 (0.6%)

Source: Euromonitor International, International Monetary Fund. Accessed via the Global Market Information Database. The Eurozone included 12 countries from 2001 to 2006. Slovenia was added in 2007.



**Figure 1. Returns from Loonies Under a Bed and One Share of the DJIA Assuming a Purchase Date of January 2, 2001.**

Figure Two: CAD Growth Minus Stocks Growth



Data on DJIA closing prices and CAD exchange rates was obtained using Global Financial Data. Data on dividends, splits and spin-offs was obtained using the Bloomberg Database and through direct contact with DJIA companies.

**RED** pixels: CAD return beats “one share of the DJIA” return.

**Green** pixels: “one share of the DJIA” return beats CAD return.

**Horizontal axis includes all purchase dates 1/2/01 to 12/31/06 (left-to-right).**

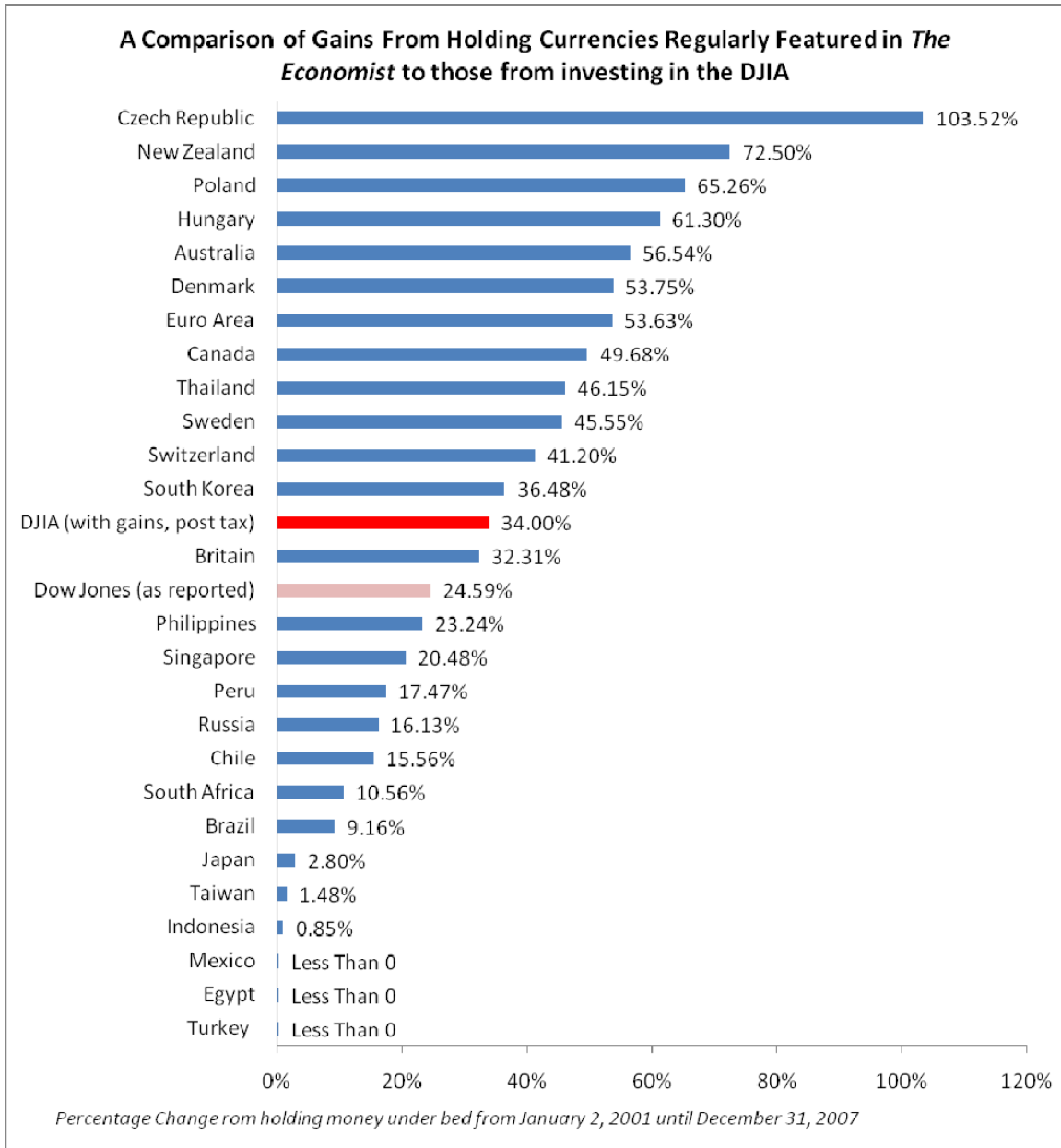
**Vertical axis contains all “cash in” dates 1/1/02 to 12/31/07 (top-to-bottom).**

**Post-tax returns compared.**

**Figure 2. Returns from Options 1 and 2 for all possible holding periods of one year or greater, 2001-2007.**

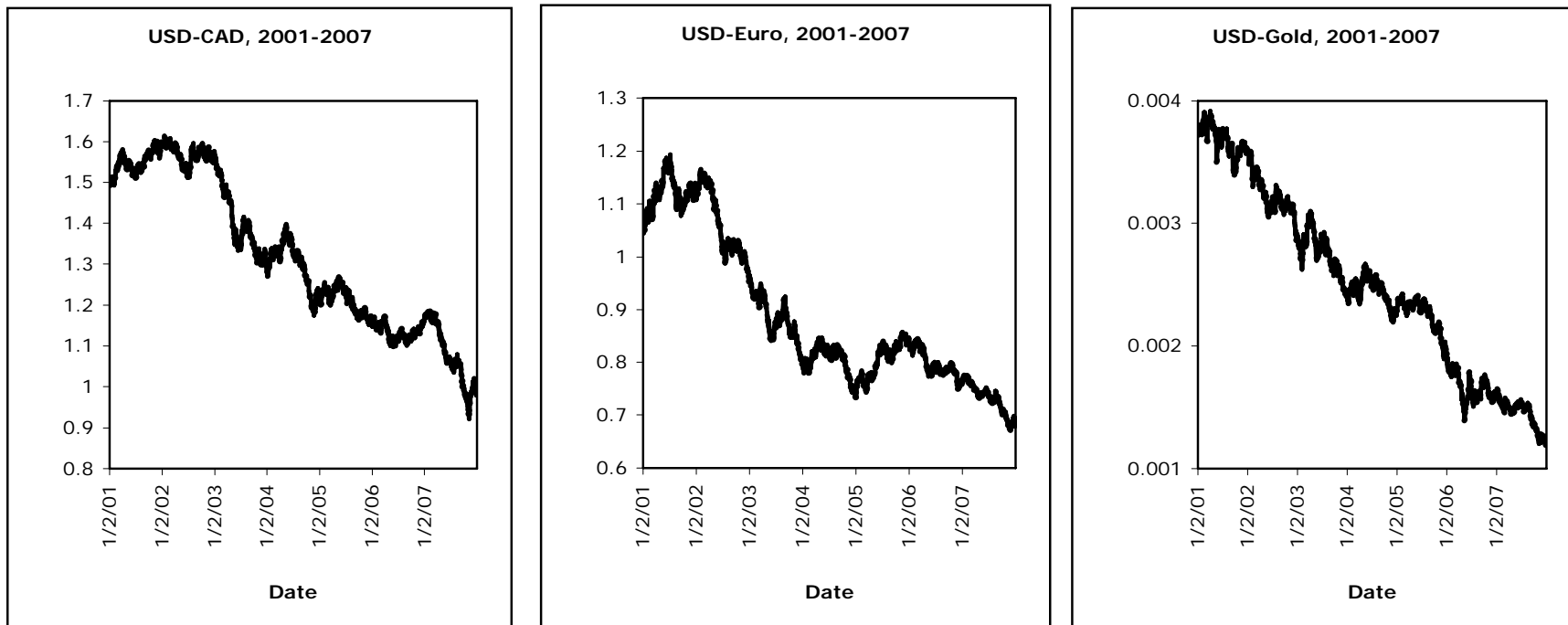
Note for reviewers from Footnote 6: “The reason that more than 9 percent of the figure appears to be red is that this image is made of far less than 1.1 million pixels. Since all pixel-reducing coloration algorithms that we could have used produce a visual bias, we chose an algorithm that has a bias towards green pixels.”





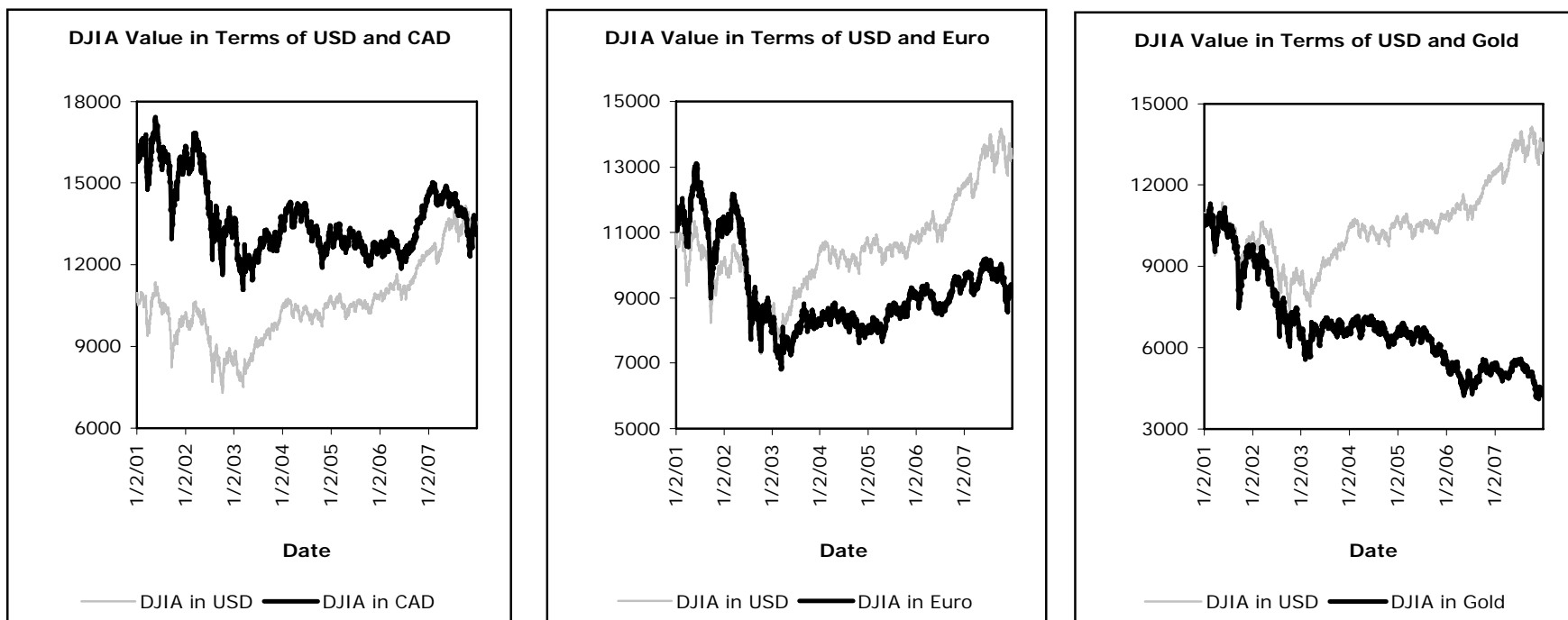
Results obtained using closing exchange rates as reported by Global Financial Data.

**Figure 3. Buying a Share of the DJIA versus Holding Twenty-Six Currencies Under a Bed, 2001-2007**



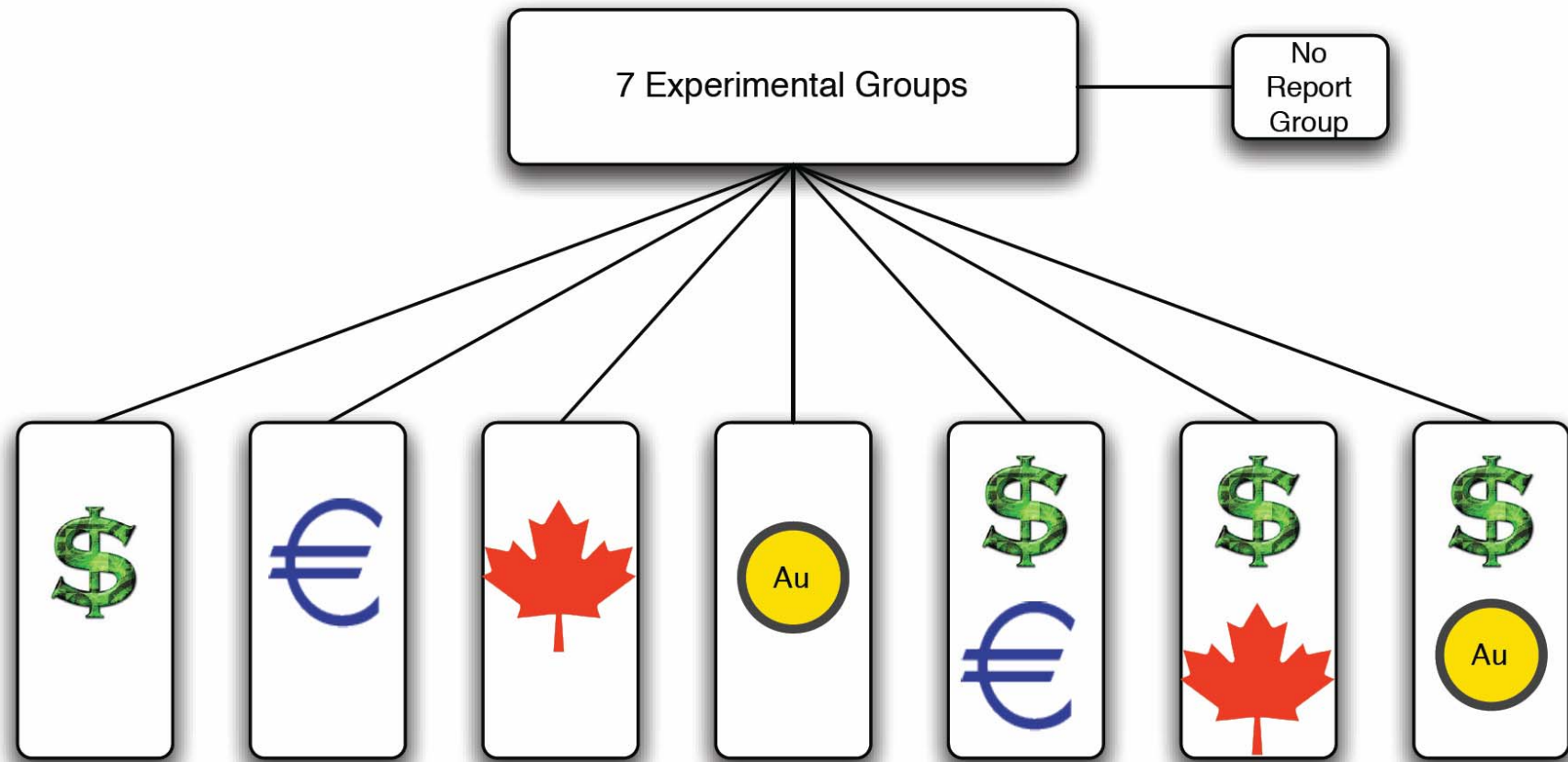
CAD and Euro comparisons use daily closing prices as reported by Global Financial Data. Gold comparison uses the daily price of an ounce of gold as reported by Global Financial Data.

**Figure 4a. Decline of USD relative to CAD, Euro, and Gold**

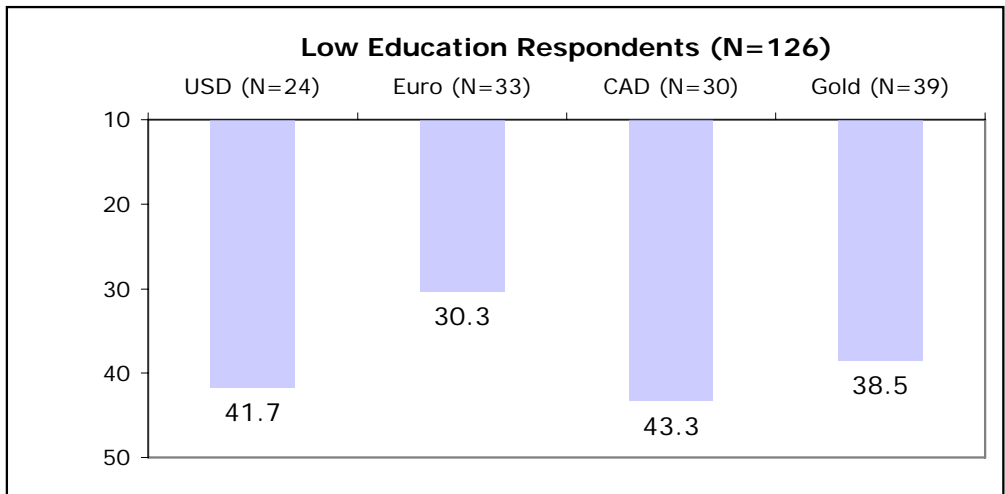
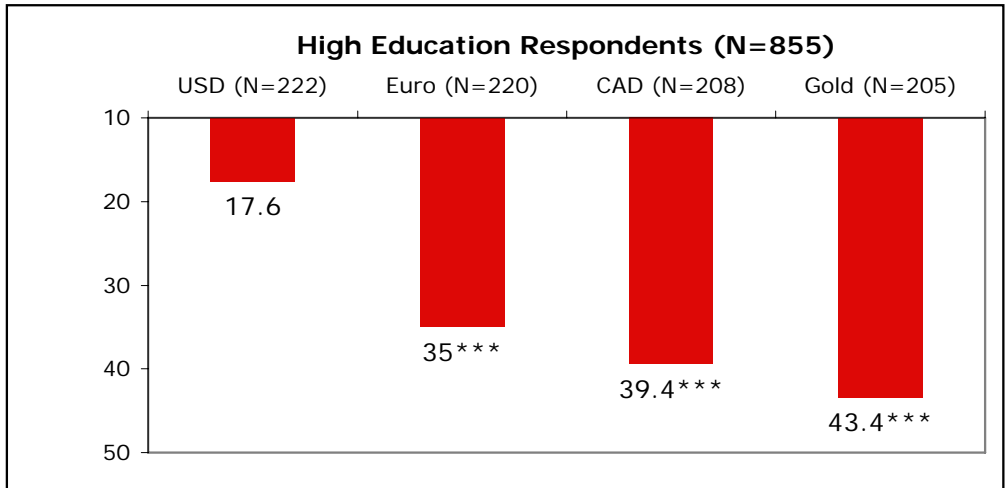
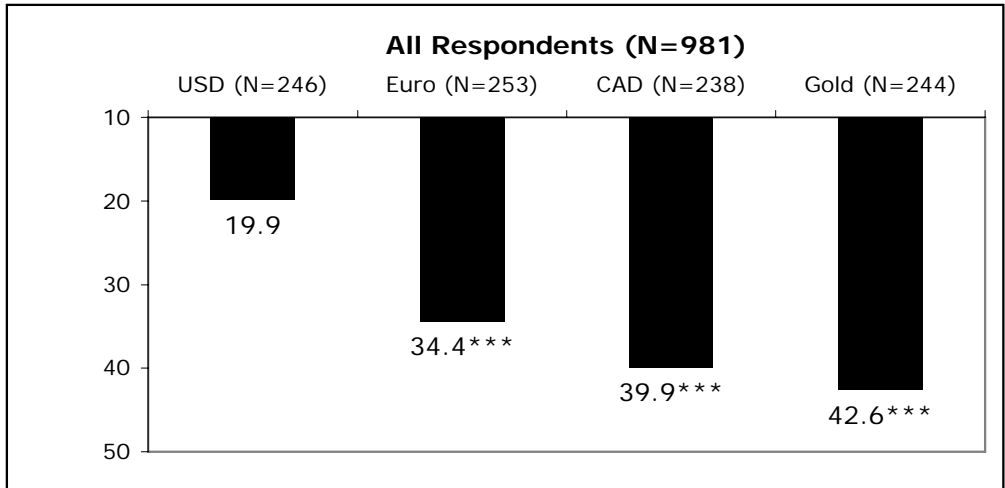


DJIA-Gold values are computed as follows. We begin by taking the number of USD that equals the average DJIA closing point total for January 2001. This is 10682.74 USD. Then, for every day in our series, we use the daily price of an ounce of gold to compute the ounces of gold that one share of the DJIA could purchase on that day. In order to normalize these numbers in terms of DJIA points, we then multiplied these numbers by 10682.74, thereby creating a number that is relative to the average closing value of the DJIA in January 2001. CAD and Euro comparisons use daily closing prices. All data obtained via Global Financial Data

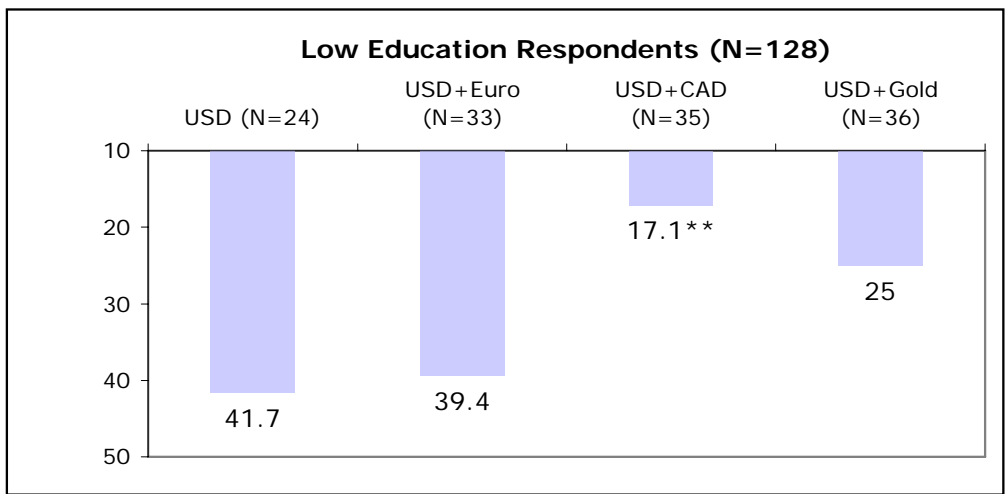
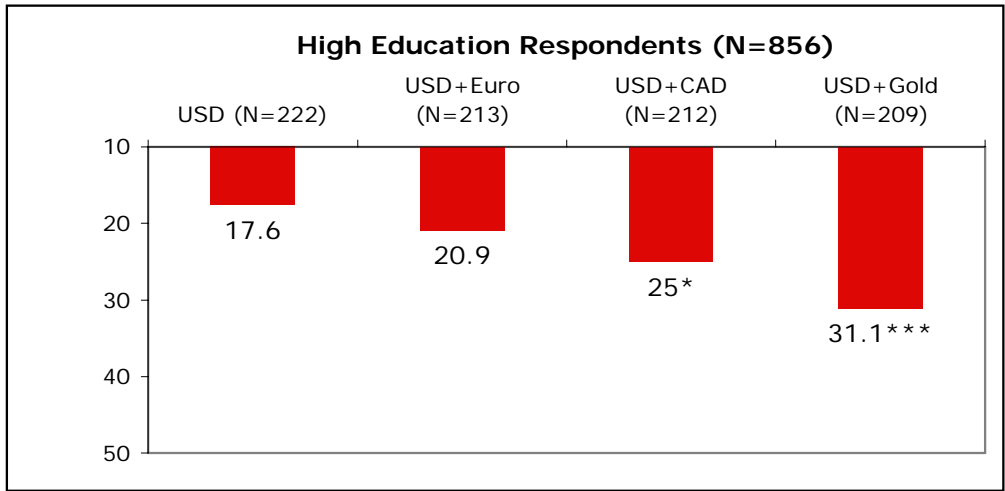
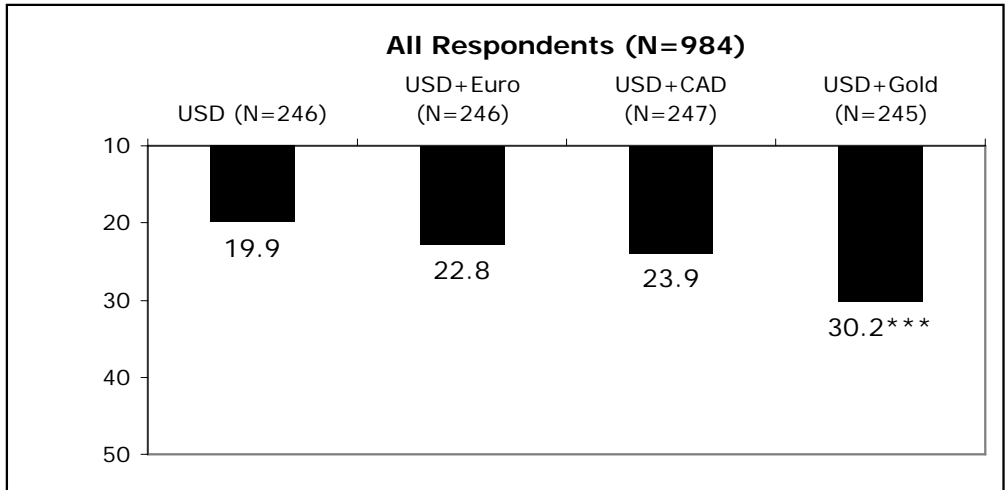
**Figure 4b. DJIA value relative to CAD, Euro, and Gold, 2001-2007.**



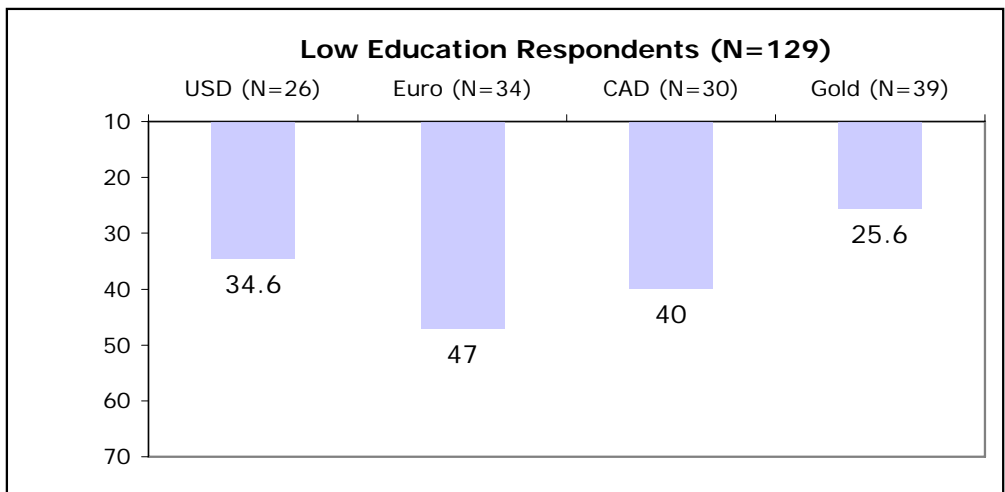
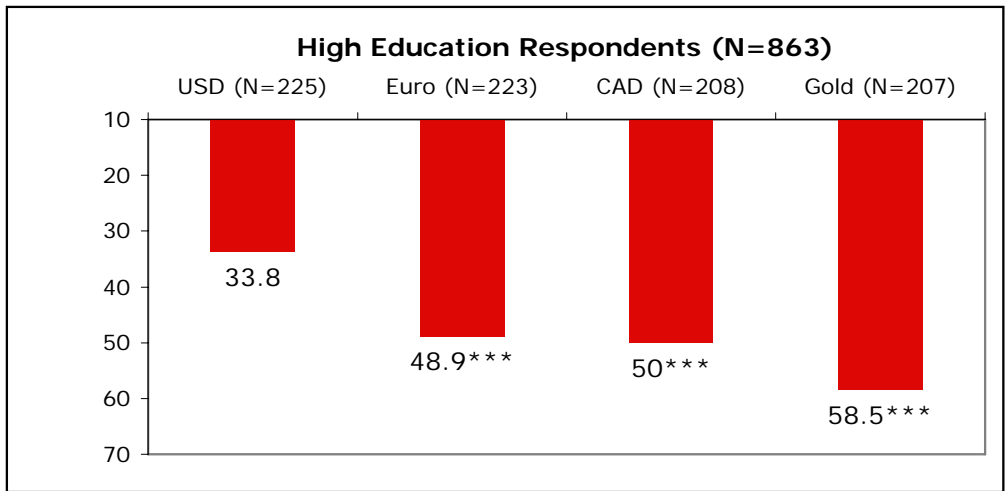
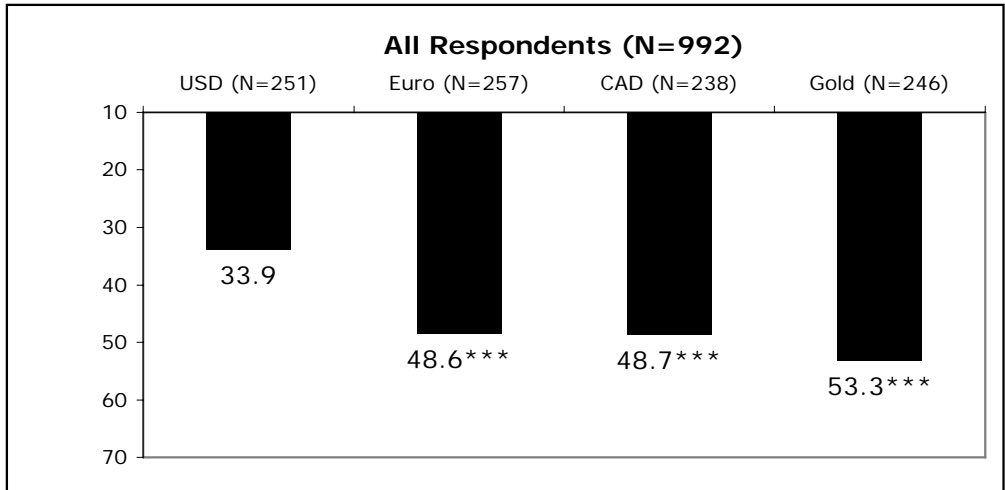
**Figure 5. Experimental Design.** Each subject is equally likely to be assigned to one of the pictured groups.



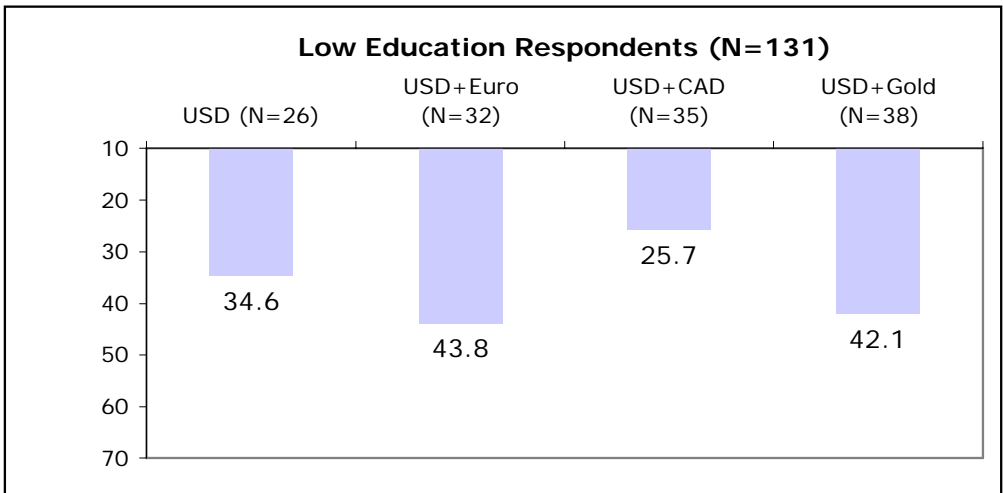
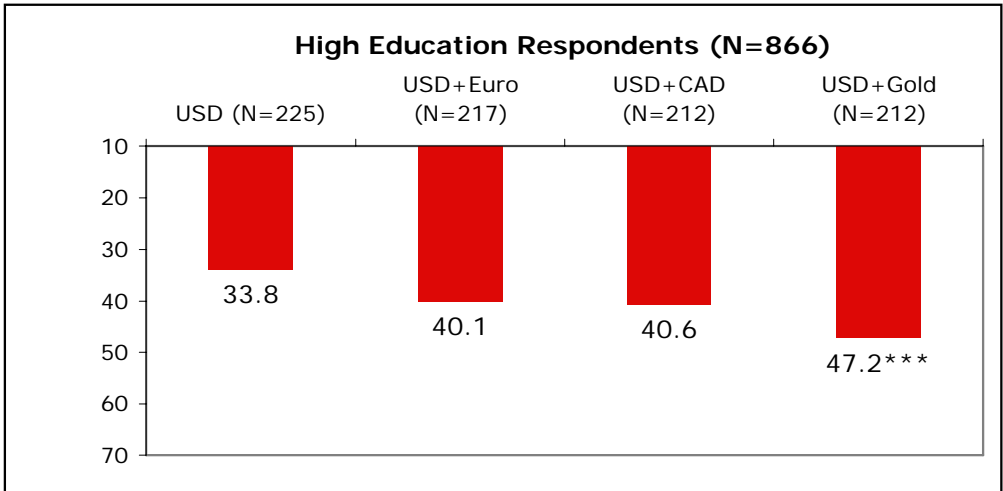
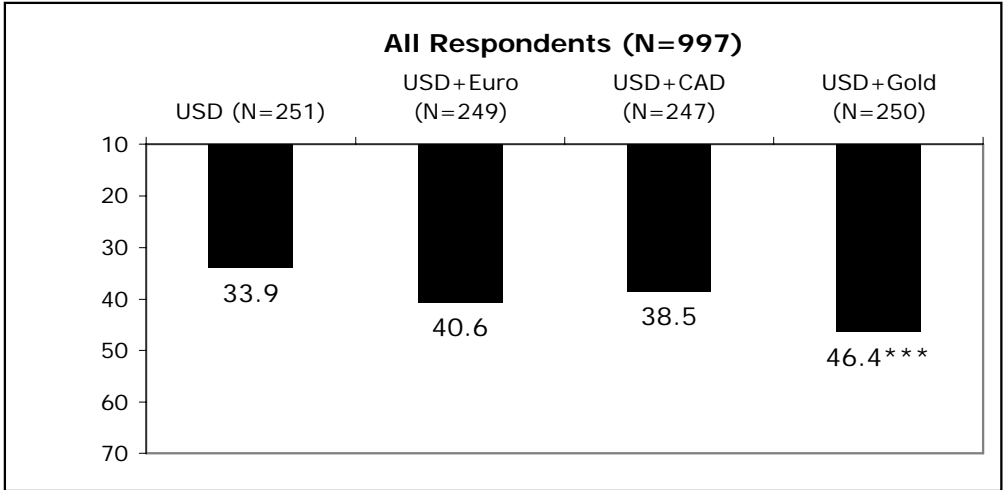
**Figure 6: Percent of Subjects who responded “Somewhat Worse” or “Much Worse” to “Given what you have just read” question after observing DJIA information in USD, CAD, Euros, or Gold. \*\*\* denotes  $p < .01$ .**



**Figure 7: Percent of subjects who responded “Somewhat worse” or “Much worse” to “Given what you have just read” question after observing DJIA information in double-currency treatment groups. \* denotes  $p < .1$ , \*\* denotes  $p < .05$ , and \*\*\* denotes  $p < .01$ .**



**Figure 8a: Percent of subjects who responded “Somewhat bad” or “Very bad” to “Overall condition” question after observing DJIA information in single-currency treatment groups. \*\*\* denotes  $p < .01$ .**



**Figure 8b: Percent of subjects who responded “Somewhat bad” or “Very bad” to “Overall condition” question after observing DJIA information in double-currency treatment groups. \*\*\* denotes  $p < .01$ .**



## ENDNOTES

---

<sup>1</sup> Whether the federal government will sustain Social Security at current levels for future generations or cut benefits is an open question. According to the report, “Social Security could be brought into actuarial balance over the next 75 years in various ways, including an immediate increase of 16 percent in payroll tax revenues or an immediate reduction in benefits of 13 percent or some combination of the two. Ensuring that the system is solvent on a sustainable basis beyond the next 75 years would require larger changes. To the extent that changes are delayed or phased in gradually, larger adjustments in scheduled benefits and revenues would be required that would be spread over fewer generations.”

<sup>2</sup> The exception is at the moments when the divisor is changed. At such moments, which occur several times per year, there is a discrete jump from one linear dollar-points correspondence to another.

<sup>3</sup> At the time, American Telephone and Telegraph was the residual of a once larger entity. It shrank after agreeing to breakup as part of an antitrust settlement with the US Department of Justice. Several splinter companies became known as “baby bells.” One “baby bell,” SBC Communications, bought the remains of its former parent in 2005. It renamed the merged entity AT&T. “The new AT&T” is now part of the DJIA.

<sup>4</sup> If on 1/2/01, the subject purchased 6.506432 shares of DJIA stock, the summed listing price of one share of each of the original 30 stocks on 12/31/07 was 2064.43 USD. Adding revenues accruing to shareholders from splits, spinoffs, and dividends (219.42 USD) and multiplying by 6.506432 yields a cumulative value on 12/31/2007 of 14859.70 USD. To simplify the calculation, we assume that in the case of spinoffs the investor takes the cash value of newly offered shares (i.e., we treat spinoff proceeds as dividends).

<sup>5</sup> Consider an alternate interpretation of this result. On January 2, 2001, let the subject purchase “one share of the DJIA” for the USD equivalent of 15,877.67 CAD. The post-tax return from selling these assets on December 31, 2007 is the USD equivalent of 14176.45 CAD. *This is 1701.22 CAD less than her original investment.* Measured in CAD, the DJIA investor *is worse off financially.* Indeed, on any day that the loonie line is north of the DJIA line in Figure 1, DJIA investors lost value when in CAD terms.

<sup>6</sup> This argument parallels Modigliani and Cohn (1979), who argued that investors who fail to adjust long-term expectations about expected growth to variations in price levels overvalue stocks when inflation is high and undervalue them when inflation is low (also see Cohen, Polk, and Vuolteenaho (2005)).

<sup>7</sup> <http://www.nytimes.com/2007/07/14/business/14markets.html>. On July 13 and 14, 2007, the New York Times published four articles about the DJIA. Of these four articles, only the article cited in the text also mentioned the declining value of the USD.

<sup>8</sup> The search was conducted using Lexis-Nexis. The dates of the DJIA records in the last quarter of 2006: October 3, 2006 (11727.34); October 5, 2006 (11866.69); October 10, 2006 (11867.17); October 12, 2006 (11947.7); October 13, 2006 (11960.51); October 16, 2006 (11980.6); October 18, 2006 (11992.68); October 19, 2006 (12011.73); October 23, 2006 (12116.91); October 24, 2006 (12127.88); October 25, 2006 (12134.68); October 26, 2006 (12163.66); November 8, 2006 (12176.54); November 14, 2006 (12218.01); November 15, 2006 (12251.71); November 16, 2006 (12305.82); November 17, 2006 (12342.56); December 14, 2006 (12416.76); December 15, 2006 (12445.52); December 19, 2006 (12471.32); and December 27, 2006 (12510.57).

<sup>9</sup> We excluded the “Inside” and “Today in Business” features, as they simply tease inside content by providing verbatim quotes from full articles. We coded each article for the following characteristics: (1) Did the article have a graphic? (2) What did this graphic show? (3) Did the article mention the exchange rate? If so, where did this appear? (4) Did the article mention the trade deficit? If so, where in this article did this appear? (5) Did the article explain how changes in the dollar/trade deficit affect the DJIA? (6) Did the article mention the Dow being a “dollar-weighted” index? Three coders (Grafstrom, Krupnikov, and McGovern) performed the analysis. Two coders analyzed each article independently. Overall, the inter-coder reliability was 0.88.

<sup>10</sup> The survey began with all subjects answering the question, “What does the Dow Jones Industrial Average measure? The number of people who work for the Dow Jones company, the value of the stocks of major American companies, [or] the height of buildings used in industrial production.” Over ninety-eight percent of subjects answered this question correctly. Next, all subjects were shown the correct answer. The purpose of this question was to document subjects’ abilities to understand the content of our experimental stimuli and to provide a needed definition to subjects who did not answer the question correctly. For the

---

same reason, subjects in treatment groups that received DJIA information in Euro terms, we also asked, "The Euro is the name of the currency of: "the United Kingdom," "15 of the 27 member countries of the European Union," or "Japan?"" 83 percent of subjects who were asked this question answered it correctly. After answering the question, all subjects were shown the correct answer.

<sup>11</sup> The average subject completed the survey in 5.34 minutes. This estimate is the average time taken by the 1989 subjects who took less than one hour to complete the survey. The manner in which the survey was administered allowed subjects to begin the survey, leave to do something else, and return to complete the survey at a later time. We believe that this was the case for our other 50 subjects. Fourteen subjects completed the survey in more than one, but less than twelve hours. Thirty-six subjects completed the survey in more than twelve hours.

<sup>12</sup> The number of subjects in each group is as follows: "no report", 266; USD only, 255; Euro only, 263; CAD only, 242; Gold only, 252; USD & Euro, 253; USD & CAD, 253; USD & Gold, 255.

<sup>13</sup> Less than ten percent of subjects in these groups responded that the stimulus made them feel better about the DJIA's performance (this compares to nearly 30% for the USD group).

<sup>14</sup> In this respect, our result parallels that of Sausgruber and Tyran (2005) who to show that subjects can, given proper feedback, learn to adapt to a real-nominal blindness associated with indirect taxation.

<sup>15</sup> Not depicted in Figure 8a is the relationship between the USD group and the "no report" group. We omit the "no report" from the table as our hypothesis does not include to them (it compares USD-group subjects to those who see DJIA reports on other ways). We use the "no report" to gauge sentiment about the stock market absent any stimulus. It should be contingent on stock market performance at the time of interview. Roughly 40% of "no report" subjects described the market's condition as bad. Of the USD group subjects, who had earlier been reminded that the DJIA actually increased in value, only 34% said "bad." The difference between the two groups suggest that without prompting, citizens in February of 2008 (a bad time for the Dow) remembered the DJIA's 2007 performance as being worse than it actually was.

<sup>16</sup> Among denomination-determined reserves; see <http://www.imf.org/external/np/sta/cofer/eng/cofer.pdf>.

<sup>17</sup> Our GDP data comes from the IMF and was accessed via the Global Market Information Database.

<sup>18</sup> Or, as *The Economist* (2004) argued, "The euro area, unlike America, is a net creditor. Never before has the guardian of the world's main reserve currency been its biggest net debtor. And a debtor may be tempted to use devaluation to reduce its external deficit—hardly a desirable property for a reserve currency. Those bearish on the dollar are asking why investors will want to hold the assets of a country that has, by its own actions, jeopardised its reserve-currency position... The issue is not whether America can afford to take on more debt, but whether the rising debt burden will make investors less willing to finance future deficits at current exchange and interest rates... Despite its recent drop, the dollar is far from cheap... Yet America's current-account deficit is much bigger today than in the 1980s, so the dollar is likely to fall more sharply. Some economists reckon that it needs to fall by at least another 30%. That would imply a rate of over \$1.80 [USD] for one euro, compared with today's \$1.33."